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Using spatial information technologies as monitoring devices in international watershed conservation along the Senegal River Basin of West Africa

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Abstract:

In this paper, we present the applications of spatial technologies-Geographic Information Systems (GIS) and remote sensing-in the international monitoring of river basins particularly analyzing the ecological, hydrological, and socio-economic issues along the Senegal River. The literature on multinational water crisis has for decades focused on mediation aspects of trans-boundary watershed management resulting in limited emphasis placed on the application of advances in geo-spatial information technologies in multinational watershed conservation in the arid areas of the West African sub-region within the Senegal River Basin for decision-making and monitoring. While the basin offers life support in a complex ecosystem that stretches across different nations in a mostly desert region characterized by water scarcity and subsistence economies, there exists recurrent environmental stress induced by both socio-economic and physical factors. Part of the problems consists of flooding, drought and limited access to sufficient quantities of water. These remain particularly sensitive issues that are crucial for the health of a rapidly growing population and the economy. The problems are further compounded due to the threats of climate change and the resultant degradation of almost the region's entire natural resources base. While the pace at which the institutional framework for managing the waters offers opportunities for hydro electricity and irrigated agriculture through the proliferation of dams, it has raised other serious concerns in the region. Even where data exists for confronting these issues, some of them are incompatible and dispersed among different agencies. This not only widens the geo-spatial data gaps, but it hinders the ability to monitor water problems along the basin. This study will fill that gap in research through mix scale methods built on descriptive statistics, GIS and remote sensing techniques by generating spatially referenced data to supplement the existing ones for the management of the Senegal River Basin. The results show the incidence of change predicated on pressures from demography, natural forces and the proliferation of river basin development which resulted in more irrigated areas to meet the needs of the inhabitants of the basin. With the substantial increase in bare surface areas, the basin faces growing exposure to the threats of desertification.

Source: Ask your librarian to help locate this item.

Resource Description

Communication: M

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

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Communication Audience: M

audience to whom the resource is directed

Policymaker

Exposure: •

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event

Extreme Weather Event: Drought, Flooding

Geographic Feature: **☑**

resource focuses on specific type of geography

Desert, Freshwater

Geographic Location: M

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Region, African Country

Other African Region: Senegal River Basin

Other African Country: The Gambia; Guinea; Guinea Bissau; Mali; Mauritania; Senegal

Health Impact: M

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: M

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

Resource Type: M

format or standard characteristic of resource

Research Article

Timescale: M

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time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: **☑**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content